

Michael Bolotski
Application No.: 09/480,986
Page 10

PATENT

CLEAN COPY OF CLAIMS

- Sub B1*
1. (Amended) A method for operating a display having a plurality of pixel elements, comprises:
- applying a transition voltage to the plurality of pixel elements, each pixel element including a liquid crystal material having at least a first state and a second state, wherein a transition of the liquid crystal material from the first state to the second state has an associated first transition time, wherein a transition of the liquid crystal material from the second state to the first state has an associated second transition time, wherein the first transition time is longer than the second transition time, and wherein the transition voltage induces liquid crystal material in each pixel element to begin transitioning to the second state;
 - applying a first paint voltage to one pixel element of the plurality pixel elements, wherein the first paint voltage induces liquid crystal material in the one pixel element to a third state; thereafter
 - waiting a predetermined time period; thereafter
 - illuminating the one pixel element; thereafter
 - applying the transition voltage to the plurality of pixel elements;
 - applying a second paint voltage to the one pixel element elements, wherein the second paint voltage induces the liquid crystal material in the one pixel element to a fourth state; thereafter
 - waiting the predetermined time period; and thereafter
 - illuminating the one pixel element;
- wherein the transition voltage is between the first paint voltage and the second paint voltage.
- At Concl*

- N.E.*
2. The method of claim 1 wherein d) comprises illuminating the one pixel element with an illumination source of a first color, and h) comprises illuminating the one pixel element with an illumination source of a second color.

- Sub B2*
3. (Amended) The method of claim 1 further comprising after h):
- applying the transition voltage to the plurality of pixel elements, wherein the transition voltage induces liquid crystal material in each pixel element to begin transitioning to the second state;
 - applying a third paint voltage to the one pixel element elements, wherein the third paint voltage induces the liquid crystal material in the one pixel element to a fifth state; thereafter
 - waiting the predetermined time period; and thereafter
 - illuminating the one pixel element,
- wherein d) comprises illuminating the one pixel element with an illumination source of a first color, h) comprises illuminating the one pixel element with an illumination source of a second color, and l) comprises illuminating the one pixel element with an illumination source of a third color.
- At Concl*

Michael Bolotski
Application No.: 09/480,986
Page 11

PATENT

NK
Sub 5. The method of claim 3 wherein the first color, the second color, and the third color are selected, without replacement, from the group: red color, green color, blue color.

Sub 5. (Amended) The method of claim 1 wherein d) both comprise illuminating the one pixel element with the illumination source.

Sub 6. (Amended) The method of claim 1 wherein applying the transition voltage to the plurality of pixel elements comprises applying the transition voltage to all of the plurality of pixel elements at one time while holding a common electrode at a constant value .

Sub 7. (Amended) The method of claim 1 wherein applying the transition voltage to the plurality of pixel elements comprises:

applying the transition voltage to a first row of pixel elements from the plurality of pixel elements while holding a common electrode at a constant value ; and thereafter

applying the transition voltage to a second row of pixel elements from the plurality of pixel elements while holding the common electrode at a constant value .

Sub 8. (Amended) The method of claim 1 wherein applying the transition voltage to the plurality of pixel elements comprises:

applying the transition voltage to a first column of pixel elements from the plurality of pixel elements while holding a common electrode at a constant value ; and thereafter

applying the transition voltage to a second column of pixel elements from the plurality of pixel elements while holding the common electrode at a constant value .

Sub 9. (Amended) A display having a plurality of pixel elements comprises:

a transaction circuit coupled to each pixel element in the plurality of pixel elements, the transaction circuit configured to apply a transition voltage to the plurality of pixel elements , each pixel element including a liquid crystal material having at least a first state and a second state, wherein a transition of the liquid crystal material from the first state to the second state has an associated first transition time, wherein a transition of the liquid crystal material from the second state to the first state has an associated second transition time, wherein the first transition time is longer than the second transition time, and wherein the transition voltage induces liquid crystal material in each pixel element to begin transitioning to the second state ;

a paint circuit coupled to the transaction circuit, the paint circuit configured to apply a first paint voltage and a second paint voltage to one pixel element from the plurality of pixel elements after the transition voltage is applied to the plurality

Michael Bolotski
Application No.: 09/480,986
Page 12

PATENT

~~of pixel elements, wherein the first paint voltage induces liquid crystal material in the one pixel element to a third state, and wherein the second paint voltage induces the liquid crystal material in the one pixel element to a fourth state;~~

~~a timer circuit coupled to the paint circuit, the timer circuit configured to determine when a predetermined time period has elapsed;~~

~~an illumination circuit coupled to the timer circuit, the illumination circuit configured to illuminate the one pixel element after the predetermined time period has elapsed;~~

~~wherein the transition voltage is applied to the plurality of pixel elements before the first paint voltage is applied to the plurality of pixel elements, and wherein the transition voltage is applied to the plurality of pixel elements after the one pixel element is illuminated and before the second paint voltage is applied to the plurality of pixel elements.~~

A3
CONF
N.E!

10. The display of claim 9

~~wherein the illumination circuit is configured to illuminate the one pixel element with a first color after the first paint voltage is applied to the one pixel element, and~~

~~wherein the illumination circuit is configured to illuminate the one pixel element with a second color after the second paint voltage is applied to the pixel element.~~

Sub
B4

11. (Amended) The display of claim 9

~~wherein the paint circuit is also configured to apply a third paint voltage to one pixel element from the plurality of pixel elements after the transition voltage is applied to the plurality of pixel elements, wherein the the second paint voltage induces the liquid crystal material in the one pixel element to a fifth state;~~

~~wherein the transition voltage is applied to the plurality of pixel elements after the one pixel element is illuminated and before the third paint voltage is applied to the plurality of pixel elements;~~

~~wherein the illumination circuit is configured to illuminate the one pixel element with a first color after the first paint voltage is applied to the plurality of pixel elements;~~

~~wherein the illumination circuit is configured to illuminate the one pixel element with a second color after the second paint voltage is applied to the plurality of pixel elements; and~~

~~wherein the illumination circuit is configured to illuminate the one pixel element with a third color after the third paint voltage is applied to the plurality of pixel elements.~~

A4
CONF
N.R.

12. The display of claim 11 wherein the first color, the second color, and the third color are selected, without replacement, from the group: red color, green color, blue color.

N.E.
Michael Bolotski
Application No.: 09/480,986
Page 13

PATENT

~~13.~~ The display of claim 9 wherein the illumination circuit comprises a monochromatic illumination source.

~~14.~~ (Amended) The display of claim 9 wherein applying the transition voltage to the plurality of pixel elements comprises applying the transition voltage to all of the plurality of pixel elements at one time while holding a common electrode at a constant value.

~~15.~~ (Amended) The display of claim 9 wherein the transaction circuit is configured to apply the transition voltage to a first row of pixel elements from the plurality of pixel elements while holding a common electrode at a constant value before a second row of pixel elements from the plurality of pixel elements.

~~16.~~ (Amended) The display of claim 9 wherein the transaction circuit is configured to apply the transition voltage to a first column of pixel elements from the plurality of pixel elements while holding a common electrode at a constant value before a second column of pixel elements from the plurality of pixel elements.

~~17.~~ (Amended) A circuit for driving a liquid crystal display having a plurality of pixels comprises:

a ~~15~~ ~~and~~
an initializing circuit coupled to the plurality of pixels configured to apply an initial voltage to the plurality of pixels, each pixel including a liquid crystal material having at least a first state and a second state, wherein a transition of the liquid crystal material from the first state to the second state has an associated first transition time, wherein a transition of the liquid crystal material from the second state to the first state has an associated second transition time, wherein the first transition time is longer than the second transition time, and wherein the transition voltage induces liquid crystal material in each pixel to begin transitioning to the second state;

a driving circuit coupled to the initializing circuit configured to apply a first drive voltage and a second drive voltage to a pixel from the plurality of pixels after the initial voltage has been applied to the plurality of pixels, wherein the first drive voltage induces the liquid crystal material in the one pixel to a second state, and wherein the second drive voltage induces the liquid crystal material in the one pixel to a third state; and

an illumination circuit coupled to the driving circuit configured to illuminate the pixel a predetermined time period after the pixel has been driven with first drive voltage and after the pixel has been driven with the second drive voltage;

wherein the initial voltage is applied to the plurality of pixels before the pixel is driven with the first drive voltage, and

wherein the initial voltage is applied to the plurality of pixels before the second drive voltage is applied to the plurality of pixels.

N.E.
18. The circuit of claim 17

Michael Bolotski
Application No.: 09/480,986
Page 14

PATENT

wherein the illumination circuit is configured to illuminate the pixel with a first color after the first drive voltage has been applied to the pixel, and

wherein the illumination circuit is configured to illuminate the pixel with a second color after the second drive voltage has been applied to the pixel.

NC
Subj
19. The circuit of claim 17 wherein the first color and the second color are selected, without replacement, from the group: red color, green color, blue color.

Alv
20. (Amended) The circuit of claim 17 wherein the initializing circuit is configured to apply an initial voltage to all of the pixels in the plurality of pixels at one time while holding a common electrode at a constant value.

N.R.
21. The circuit of claim 17 wherein the initial voltage is between the first drive voltage and the second drive voltage.